

AMENDMENTS TO THE CLAIMS

1 1. (Currently Amended) Apparatus including
2 a first device having a plurality of network input interfaces and a plurality of
3 network output interfaces, said first device including a packet information extractor
4 coupled to at least one of said network input interface, said first device comprising
5 logic for extracting packet information without performing packet forwarding
6 decisions;
7 a second device coupled to said packet information extractor, said second
8 device ~~capable of~~ comprising logic configured for generating packet forwarding
9 information and output port information responsive to an output of said packet
10 information extractor, wherein said second device performs generating packet
11 forwarding information substantially for first packets substantially in parallel with
12 said first device performing extracting packet information for other packets, wherein
13 the second device accesses a forwarding memory to record one or more forwarding
14 information rules as the forwarding information rules become available to the second
15 device in response to changes in any one of network topology, access control, and
16 administrative and managerial rules;
17 an information link, coupled to said first device and said second device;
18 a network flow routing engine coupled to said second device, wherein the
19 network flow routing engine determines network flow packet forwarding information
20 in response to receiving network flow information associated with said output of said
21 packet information extractor and provides said network flow packet forwarding
22 information to said second device, wherein said second device uses said network flow
23 packet forwarding information in generating said packet forwarding information.

1 2. (Original) Apparatus as in claim 1, wherein said first device includes a packet
2 rewriter coupled to at least one said net-work output interface; and

3 said second device includes a packet rewrite generator coupled to said first
4 device, said packet rewrite generator disposed for generating said packet forwarding
5 information and output port information;

6 wherein said packet rewrite element is responsive to said packet rewrite
7 generator.

1 3. (Original) Apparatus as in claim 1, including a packet buffer memory coupled to
2 said first device.

1 4. (Previously Presented) Apparatus as in claim 1, wherein said first device
2 comprises a single monolithic semiconductor circuit.

1 5. (Previously Presented) Apparatus as in claim 1, wherein said second device
2 comprises a single monolithic semiconductor circuit.

1 6. (Previously Presented) Apparatus as in claim 1, wherein a single monolithic
2 semiconductor circuit comprises said first device and said second device.

1 7. (Original) Apparatus as in claim 1, including a rewrite table including said re-
2 write information.

1 8. (Original) Apparatus as in claim 7, wherein said first device includes said re-
2 write table.

1 9. (Original) Apparatus as in claim 7, wherein said second device includes an
2 address pointing into said rewrite table, wherein said address can be forwarded to said first
3 device.

1 10. (Previously Presented) Apparatus including
2 a first device having at least one input interface and at least one output
3 interface, said first device including an information extractor having an input coupled
4 to a packet received from said input interface and having an output coupled to a first
5 memory, said first device comprising logic for extracting packet information without
6 performing packet forwarding decisions; and
7 a second device including a decision generator having an input coupled to said
8 first device, and having an output coupled to said first device, wherein said second
9 device performs generating packet forwarding information substantially for first
10 packets substantially in parallel with said first device performing extracting packet
11 information for other packets, wherein the second device accesses a forwarding
12 memory to record one or more forwarding information rules as the forwarding
13 information rules become available to the second device in response to changes in any
14 one of network topology, access control, and administrative and managerial rules;
15 wherein said first device is responsive to a forwarding treatment from said
16 second device to determine a set of said output interfaces on which to couple said
17 packet;
18 a network flow routing engine coupled to said second device, wherein the
19 network flow routing engine determines network flow packet forwarding information
20 in response to receiving network flow information associated with said packet
21 information extracted by said information extractor and provides said network flow
22 packet forwarding information to said second device, wherein said second device uses
23 said network flow packet forwarding information in generating said packet
24 forwarding information.

1 11. (Original) Apparatus as in claim 10, wherein said forwarding treatment includes
2 packet rewrite information; and
3 said first device is responsive to said packet rewrite information to rewrite said
4 packet before coupling said packet to said set of output interfaces.

1 12. (Original) Apparatus as in claim 10, wherein said forwarding treatment includes
2 at least one action relating to accounting.

1 13. (Original) Apparatus as in claim 10, wherein said forwarding treatment is
2 responsive to information regarding access control.

1 14. (Original) Apparatus as in claim 10, wherein said forwarding treatment is
2 responsive to information regarding class of service or quality of service.

1 15. (Original) Apparatus as in claim 10, wherein said forwarding treatment is
2 responsive to information regarding parsing, extracting and encoding the packet information
3 passed from said first device to said second device so as to minimize the amount of said
4 information forwarded between said first device and said second device.

1 16. (Original) Apparatus as in claim 10, wherein said forwarding treatment is
2 responsive to said packet information memory.

1 17. (Previously Presented) Apparatus as in claim 10, wherein said first device
2 comprises a single monolithic semiconductor circuit.

1 18. (Previously Presented) Apparatus as in claim 10, wherein said second device
2 comprises a single monolithic semiconductor circuit.

1 19.-22. (Canceled)

1 23. (Previously Presented) A method for packet processing comprising the
2 computer-implemented steps of:

3 at a Packet Processing Engine, receiving a plurality of input packets at one or
4 more input interfaces, distinguishing first packet header information from a first input
5 packet, and forwarding said first packet header information to a Fast Forwarding
6 Engine;

7 at the Fast Forwarding Engine, determining packet forwarding information,
8 and sending said packet forwarding information to the Packet Processing Engine;

9 a network flow routing engine coupled to said Fast Forwarding Engine,
10 wherein the network flow routing engine determines network flow packet forwarding
11 information in response to receiving network flow information associated with said
12 first packet header information and provides said network flow packet forwarding
13 information to said Fast Forwarding Engine, wherein said Fast Forwarding Engine
14 uses said network flow packet forwarding information in generating said packet
15 forwarding information;

16 generating, at said Packet Processing Engine, an output packet based on said
17 packet forwarding information and said first packet; and

18 sending said output packet from a first output interface among one or more
19 output interfaces of the Packet Processing Engine,

20 wherein the Fast Forwarding Engine is coupled to and accesses a forwarding
21 memory to record one or more forwarding information rules as the forwarding
22 information rules become available to the Fast Forwarding Engine in response to
23 changes in any one of network topology, access control, and administrative and
24 managerial rules.

1 24. (Previously Presented) A method as recited in Claim 23, wherein the steps
2 performed by the Packet Processing Engine and the steps performed by the Fast Forwarding
3 Engine are performed in parallel.

1 25. (Previously Presented) A method as recited in Claim 23, wherein said one or
2 more input interfaces are coupled to at least one communication network.

1 26. (Previously Presented) A method as recited in Claim 23, wherein the step of
2 distinguishing first packet header information from a first input packet is performed by
3 parsing said first packet.

1 27. (Previously Presented) A method as recited in Claim 23, wherein the packets
2 are stored and accessed by a packet index.

1 28. (Previously Presented) A method as recited in Claim 23, wherein the first
2 packet header includes an IP source address, IP source port, IP destination address, IP
3 destination port, protocol type, and information indicating whether the packet is unicast or
4 multicast.

1 29. (Previously Presented) A method as recited in Claim 23, wherein the step of
2 generating an output packet based on said packet forwarding information includes a rewrite
3 operation.

1 30. (Previously Presented) A method as recited in Claim 29, wherein the rewrite
2 operation includes adjusting hop count for the packet, determining a new CRC and
3 performing packet reformatting operations.

1 31. (Previously Presented) A method as recited in Claim 23, wherein said Fast
2 Forwarding Engine is coupled to assistance devices for assisting in making packet forwarding
3 decisions.

1 32. (Previously Presented) A method as recited in Claim 23 wherein said Fast
2 Forwarding Engine is coupled to a set of routing information memories.

1 33. (Previously Presented) A method as recited in Claim 23, wherein said Fast
2 Forwarding Engine is coupled to a forwarding content addressable memory.

1 34. (Canceled).

1 35. (Previously Presented) A method as recited in Claim 23, wherein said Fast
2 Forwarding Engine is coupled to an input access Content Addressable Memory and an output
3 access Content Addressable Memory.

1 36. (Canceled).

1 37. (Previously presented) A method as recited in Claim 33, wherein the Fast
2 Forwarding Engine sends the packet header information to the forwarding content
3 addressable memory.

1 38. (Previously Presented) A method as recited in Claim 36 wherein the Content
2 Addressable Memory determines packet forwarding information based on the packet header
3 information.

1 39. (Canceled).

1 40. (Previously Presented) A method as recited in Claim 23, wherein the Fast
2 Forwarding Engine accesses the forwarding Content Addressable Memory to retrieve the
3 packet forwarding information.

1 41. (Previously Presented) A method as recited in Claim 23, wherein the Fast
2 Forwarding Engine forwards an identifier to said first input interface to determine if access is
3 permitted for said first packet.

1 42. (Previously Presented) A method as recited in Claim 23, wherein the Fast
2 Forwarding Engine forwards an identifier to said first output interface to determine if access
3 is permitted for said first packet.

1 43. (Previously Presented) A method as recited in Claim 23, further comprising the
2 step of storing said first packet in said Packet Processing Engine.